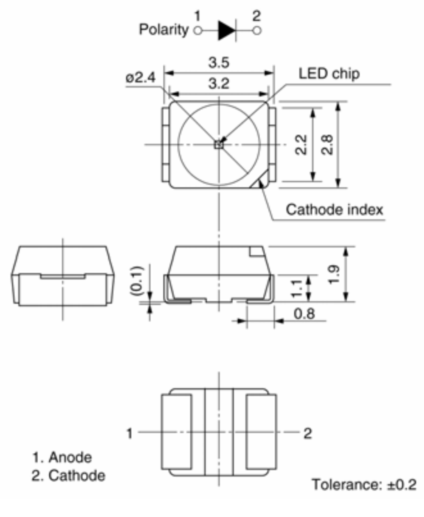
TOSHIBA LED Lamps

TLRE1100B(T11), TLSE1100B(T11), TLOE1100B(T11), TLYE1100B(T11), TLGE1100B(T11), TLFGE1100B(T11) TLPGE1100B(T11)

Panel Circuit Indicator

Unit: mm



JEDEC	―
JEITA	―
TOSHIBA	4-3R1

Weight: 0.035 g (typ.)

- Surface-mount devices
- 3.2 (L) × 2.8 (W) × 1.9 (H) mm
- Flat-top type
- InGaAℓP LEDs
- High luminous intensity
- Low drive current, high-intensity light emission
- Colors: red, orange, yellow, green, pure green
- Pb-free reflow soldering is possible
- Applications: automotive use, message signboards, backlighting etc.
- Standard embossed tape packing: T11 (2000/reel)
  8-mm tape reel

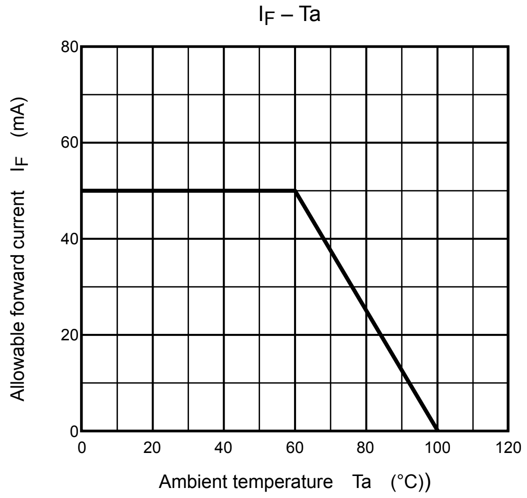
Color and Material

Product Name	Color	Material
TLRE1100B	Red	InGaAℓP
TLSE1100B	Red	
TLOE1100B	Orange	
TLYE1100B	Yellow	
TLGE1100B	Green	
TLFGE1100B	Green	
TLPGE1100B	Pure Green	

Maximum Ratings (Ta = 25°C)

Product Name	Forward Current I_F (mA) Please see Note 1	Reverse Voltage V_R (V)	Power Dissipation P_D (mW)	Operation Temperature T_{opr} (°C)	Storage Temperature T_{stg} (°C)
TLRE1100B	50	4	120	−40~100	−40~100
TLSE1100B					
TLOE1100B					
TLYE1100B					
TLGE1100B					
TLFGE1100B					
TLPGE1100B					

Note 1: Forward current derating



Electrical Characteristics (Ta = 25°C)

Product Name	Forward Voltage V_F				Reverse Current I_R	
	Min	Typ.	Max	I_F	Max	V_R
TLRE1100B	1.6	1.9	2.4	20	10	4
TLSE1100B	1.6	1.9	2.4			
TLOE1100B	1.6	2.0	2.4			
TLYE1100B	1.6	2.0	2.4			
TLGE1100B	1.6	2.0	2.4			
TLFGE1100B	1.6	2.0	2.4			
TLPGE1100B	1.6	2.1	2.4			
Unit	V			mA	μA	V

Optical Characteristics–1 (Ta = 25°C)

Product Name	Luminous Intensity I_V				Available Iv rank
	Min	Typ.	Max	I_F	Please see Note 2
TLRE1100B	40	100	320	20	PA / QA / RA / SA
TLSE1100B	63	180	500	20	QA / RA / SA / TA
TLOE1100B	63	150	500	20	QA / RA / SA / TA
TLYE1100B	63	150	500	20	QA / RA / SA / TA
TLGE1100B	40	100	320	20	PA / QA / RA / SA
TLFGE1100B	25	45	125	20	NA / PA / QA
TLPGE1100B	10	25	50	20	LA / MA / NA
Unit	mcd	mcd	mcd	mA	

Note 2: The specification on the above table is used for Iv classification of LEDs in Toshiba facility.
Each reel includes the same rank LEDs. Let the delivery ratio of each rank be unquestioned.

Rank	Luminous Intensity I_V	
	Min	Max
LA	10	20
MA	16	32
NA	25	50
PA	40	80
QA	63	125
RA	100	200
SA	160	320
TA	250	500
Unit	mcd	mcd

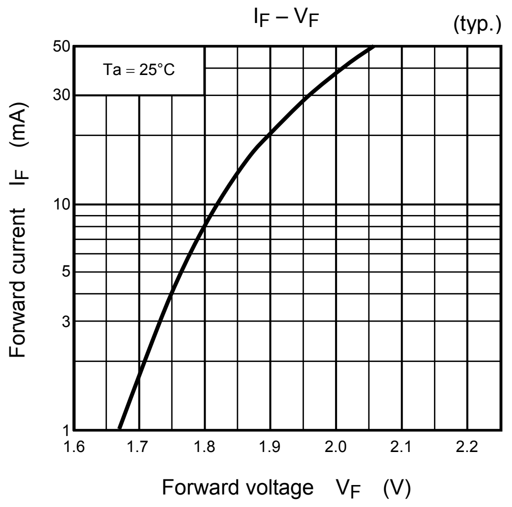
Optical Characteristics–2 (Ta = 25°C)

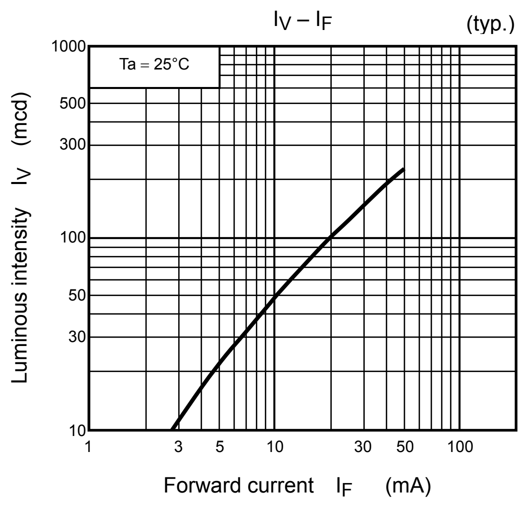
Product Name	Emission Spectrum							
	Peak Emission Wavelength λ_p			$\Delta\lambda$	Dominant Wavelength λ_d			I_F
	Min	Typ.	Max	Typ.	Min	Typ.	Max	
TLRE1100B	—	644	—	18	624	630	638	20
TLSE1100B	—	623	—	15	607	613	621	
TLOE1100B	—	612	—	15	599	605	613	
TLYE1100B	—	590	—	15	581	587	595	
TLGE1100B	—	574	—	13	565	571	576	
TLFGE1100B	—	568	—	11	561	565	569	
TLPGE1100B	—	562	—	11	555	558	564	
Unit	nm			nm	nm			mA

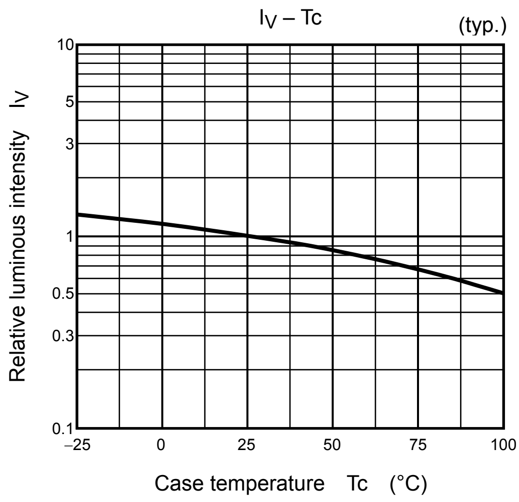
The cautions

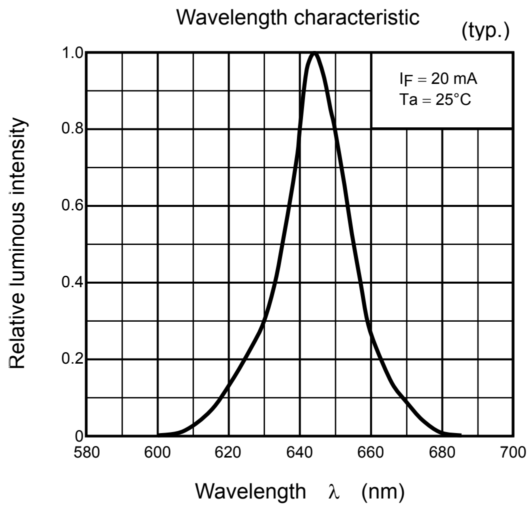
- This visible LED lamp also emits some IR light.
  If a photodetector is located near the LED lamp, please ensure that it will not be affected by the IR light.
- This product is designed as a general display light source usage, and it has applied the measurement standard that matched with the sensitivity of human's eyes. Therefore, it is not intended for usage of functional application (ex. Light source for sensor, optical communication and etc) except general display light source.

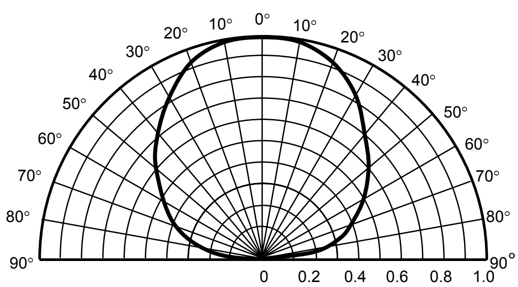
TLRE1100B


IF – VF
(typ.)
Ta = 25°C
Forward current IF (mA)
50
30
10
5
3
1
1.6
1.7
1.8
1.9
2.0
2.1
2.2
Forward voltage VF (V)

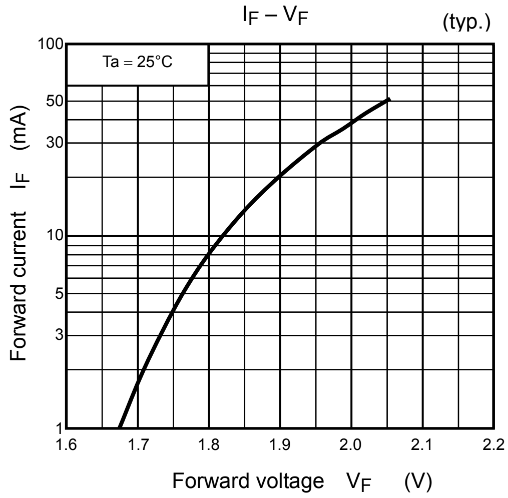

IV – IF
(typ.)
Ta = 25°C
Luminous intensity IV (mcd)
1000
500
300
100
50
30
10
1
3
5
10
30
50
100
Forward current IF (mA)

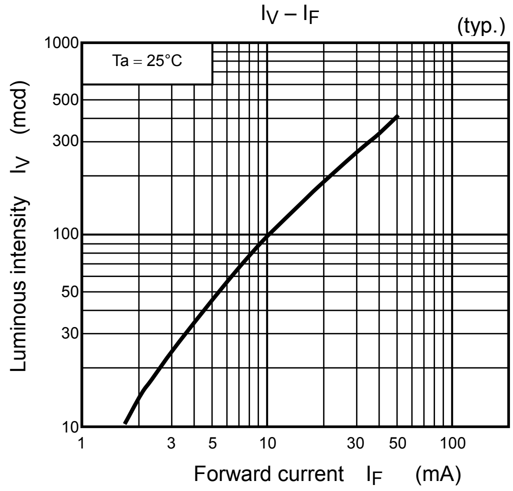

IV – Tc
(typ.)
Relative luminous intensity IV
10
5
3
1
0.5
0.3
0.1
–25
0
25
50
75
100
Case temperature Tc (°C)

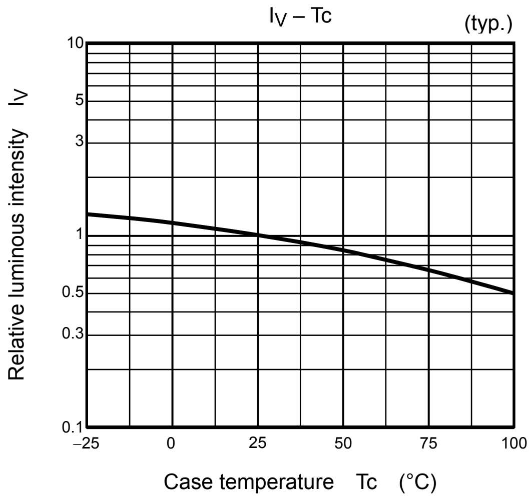

Wavelength characteristic
(typ.)
IF = 20 mA
Ta = 25°C
Relative luminous intensity
1.0
0.8
0.6
0.4
0.2
0
580
600
620
640
660
680
700
Wavelength λ (nm)

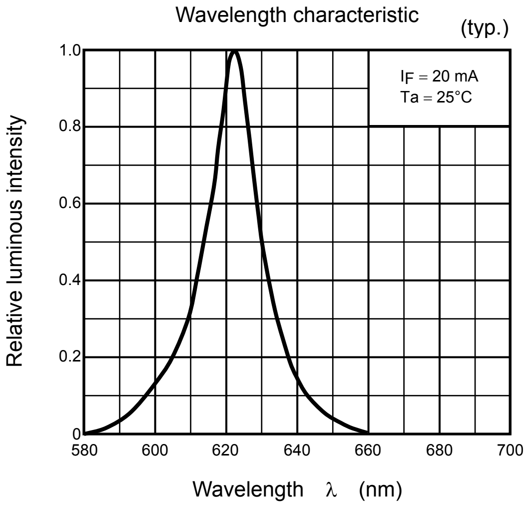

Radiation pattern
Ta = 25°C
(typ.)
0°
10°
20°
30°
40°
50°
60°
70°
80°
90°
0
0.2
0.4
0.6
0.8
1.0

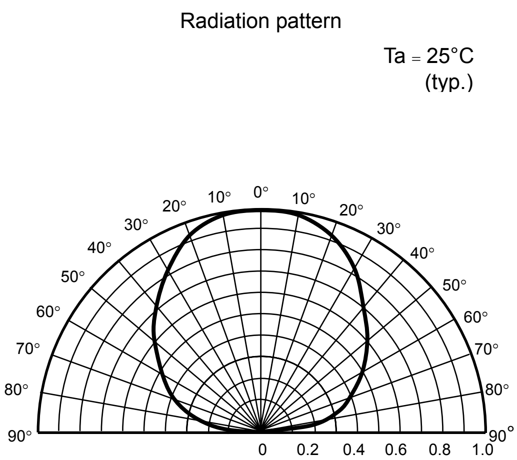
TLSE1100B


I_F – V_F
(typ.)
Ta = 25°C
Forward current I_F (mA)
100
50
30
10
5
3
1
1.6
1.7
1.8
1.9
2.0
2.1
2.2
Forward voltage V_F (V)

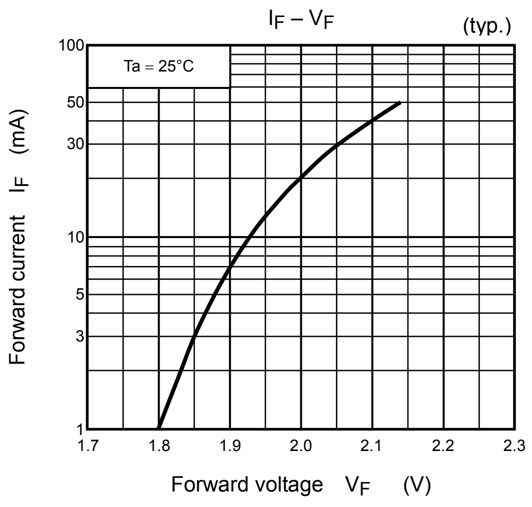

I_V – I_F
(typ.)
Ta = 25°C
Luminous intensity I_V (mcd)
1000
500
300
100
50
30
10
1
3
5
10
30
50
100
Forward current I_F (mA)

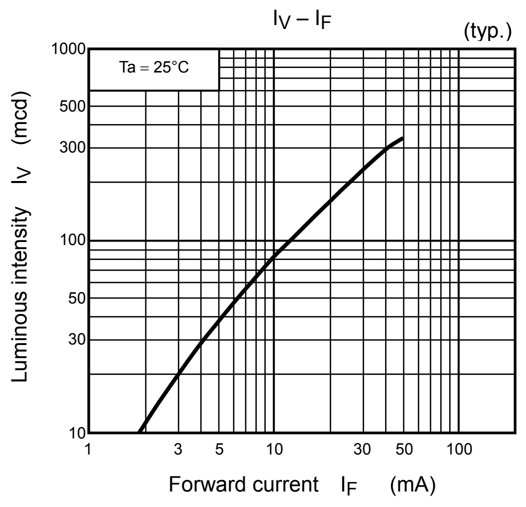

I_V – Tc
(typ.)
Relative luminous intensity I_V
10
5
3
1
0.5
0.3
0.1
–25
0
25
50
75
100
Case temperature Tc (°C)

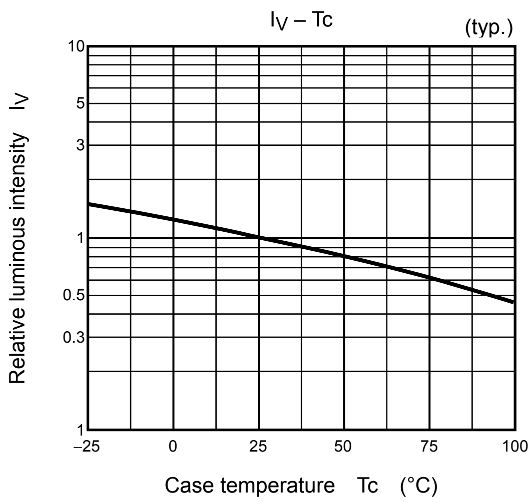

Wavelength characteristic
(typ.)
I_F = 20 mA
Ta = 25°C
Relative luminous intensity
1.0
0.8
0.6
0.4
0.2
0
580
600
620
640
660
680
700
Wavelength λ (nm)

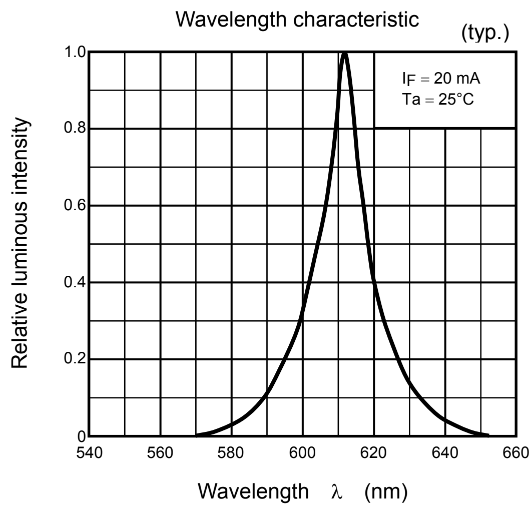

Radiation pattern
Ta = 25°C
(typ.)
0°
10°
20°
30°
40°
50°
60°
70°
80°
90°
0
0.2
0.4
0.6
0.8
1.0

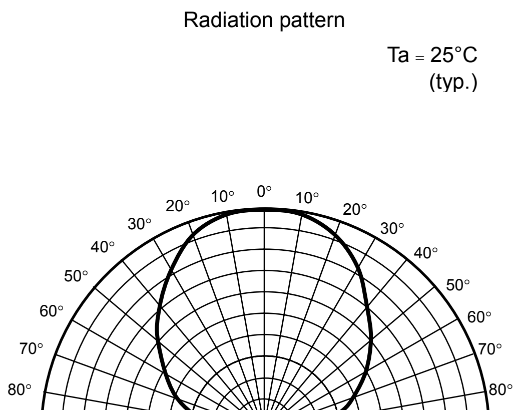
TLOE1100B


I_F – V_F
(typ.)
Ta = 25°C
Forward current I_F (mA)
100
50
30
10
5
3
1
1.7
1.8
1.9
2.0
2.1
2.2
2.3
Forward voltage V_F (V)

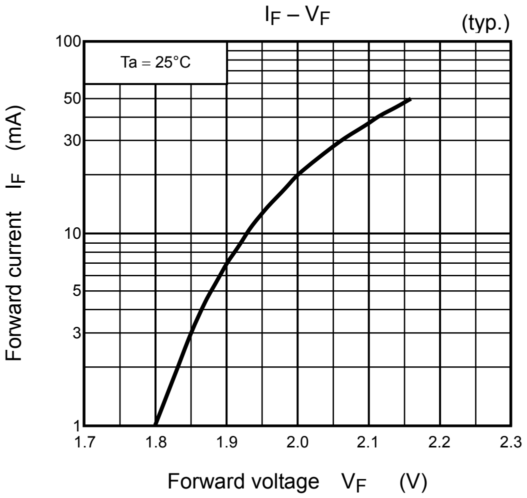

I_V – I_F
(typ.)
Ta = 25°C
Luminous intensity I_V (mcd)
1000
500
300
100
50
30
10
1
3
5
10
30
50
100
Forward current I_F (mA)

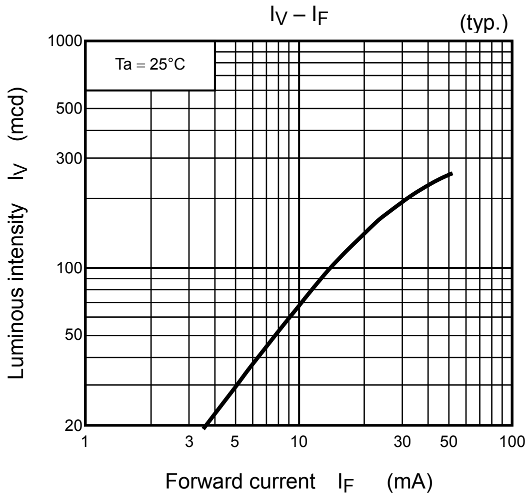

I_V – Tc
(typ.)
Relative luminous intensity I_V
10
5
3
1
0.5
0.3
1
–25
0
25
50
75
100
Case temperature Tc (°C)

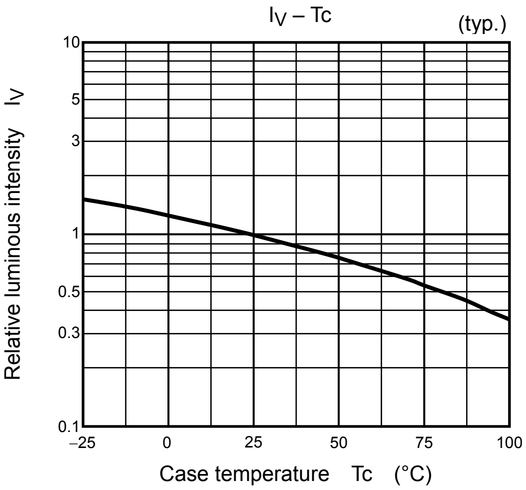

Wavelength characteristic
(typ.)
I_F = 20 mA
Ta = 25°C
Relative luminous intensity
1.0
0.8
0.6
0.4
0.2
0
540
560
580
600
620
640
660
Wavelength λ (nm)

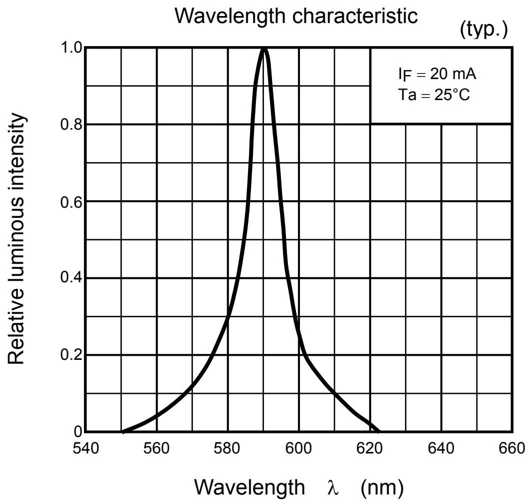

Radiation pattern
Ta = 25°C
(typ.)
0°
10°
20°
30°
40°
50°
60°
70°
80°
90°
0
0.2
0.4
0.6
0.8
1.0

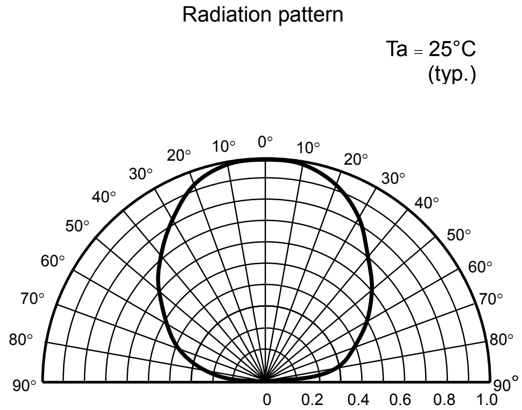
TLYE1100B


IF – VF
(typ.)
Ta = 25°C
Forward current IF (mA)
Forward voltage VF (V)
100
50
30
10
5
3
1
1.7
1.8
1.9
2.0
2.1
2.2
2.3

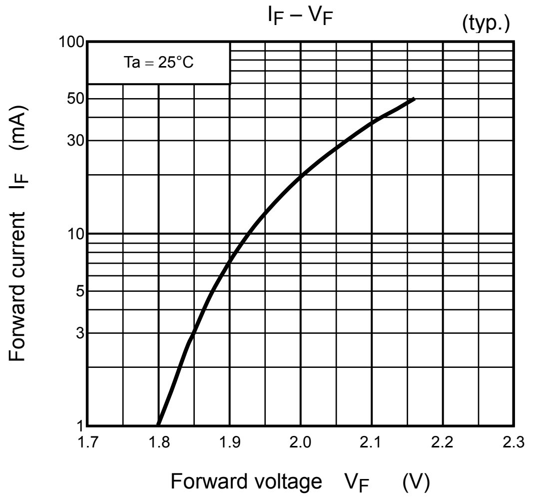

IV – IF
(typ.)
Ta = 25°C
Luminous intensity IV (mcd)
Forward current IF (mA)
1000
500
300
100
50
20
1
3
5
10
30
50
100

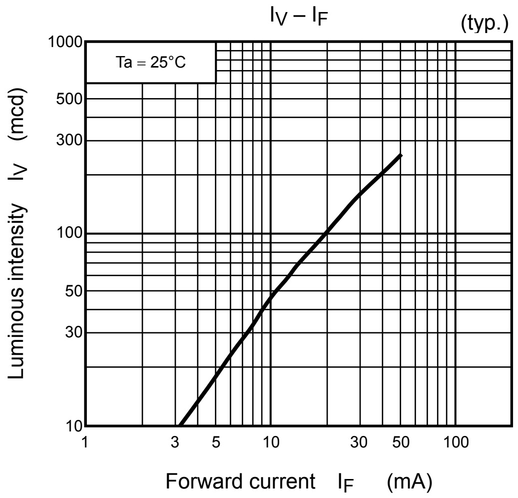

IV – Tc
(typ.)
Relative luminous intensity IV
Case temperature Tc (°C)
10
5
3
1
0.5
0.3
0.1
–25
0
25
50
75
100

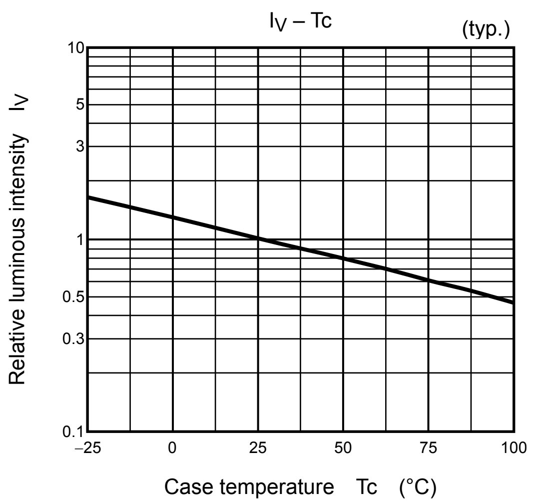

Wavelength characteristic
(typ.)
IF = 20 mA
Ta = 25°C
Relative luminous intensity
Wavelength λ (nm)
1.0
0.8
0.6
0.4
0.2
0
540
560
580
600
620
640
660

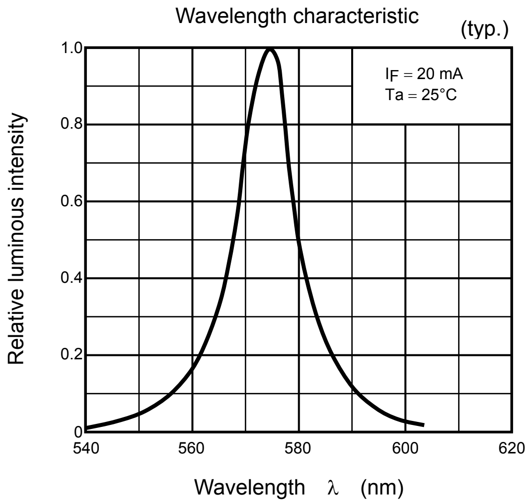

Radiation pattern
Ta = 25°C
(typ.)
0°
10°
20°
30°
40°
50°
60°
70°
80°
90°
0
0.2
0.4
0.6
0.8
1.0

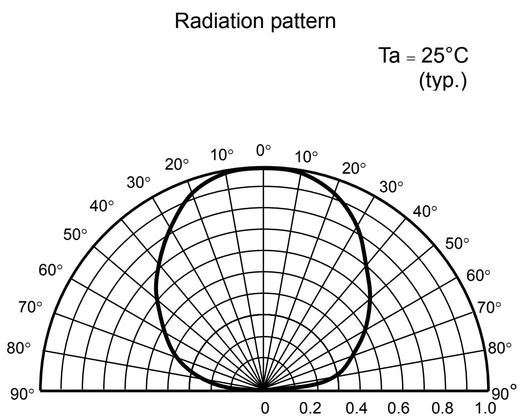
TLGE1100B


IF – VF
(typ.)
Ta = 25°C
Forward current IF (mA)
Forward voltage VF (V)
100
50
30
10
5
3
1
1.7
1.8
1.9
2.0
2.1
2.2
2.3

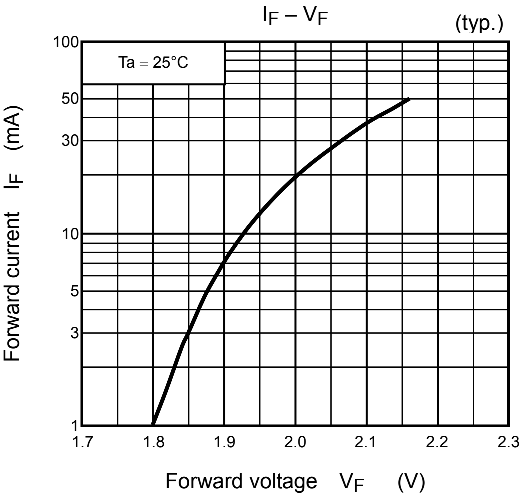

IV – IF
(typ.)
Ta = 25°C
Luminous intensity IV (mcd)
Forward current IF (mA)
1000
500
300
100
50
30
10
1
3
5
10
30
50
100

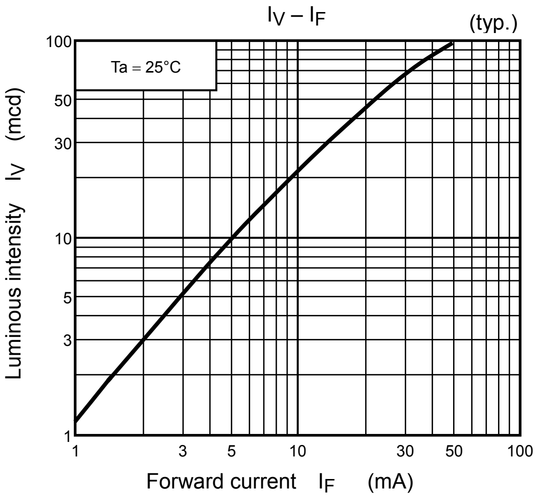

IV – Tc
(typ.)
Relative luminous intensity IV
Case temperature Tc (°C)
10
5
3
1
0.5
0.3
0.1
–25
0
25
50
75
100

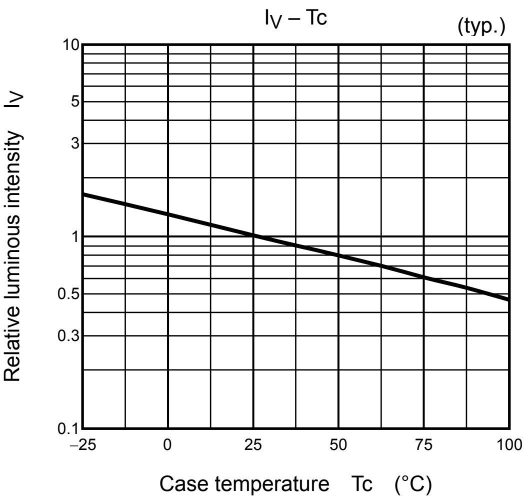

Wavelength characteristic
(typ.)
IF = 20 mA
Ta = 25°C
Relative luminous intensity
Wavelength λ (nm)
1.0
0.8
0.6
0.4
0.2
0
540
560
580
600
620

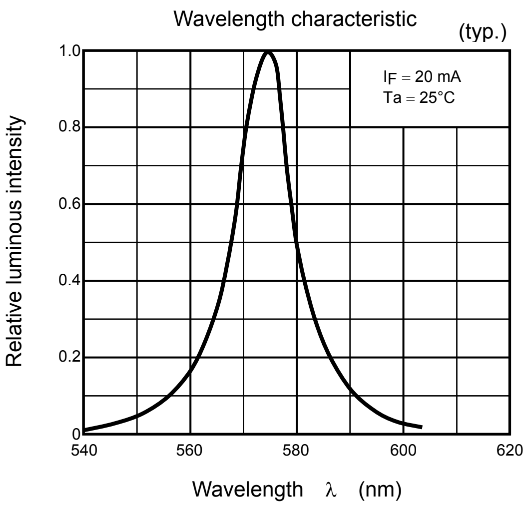

Radiation pattern
Ta = 25°C
(typ.)
0°
10°
20°
30°
40°
50°
60°
70°
80°
90°
0
0.2
0.4
0.6
0.8
1.0

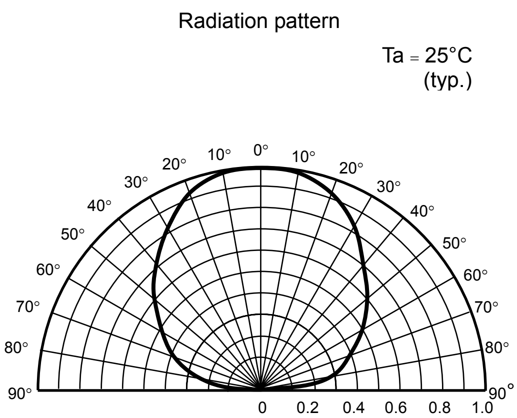
TLFGE1100B


IF – VF
(typ.)
Ta = 25°C
100
50
30
10
5
3
1
1.7
1.8
1.9
2.0
2.1
2.2
2.3
Forward current IF (mA)
Forward voltage VF (V)

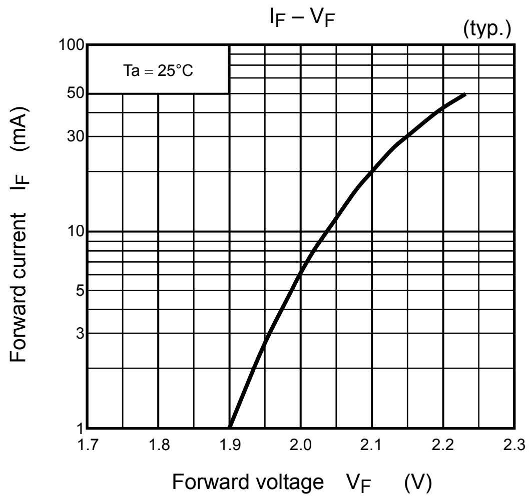

IV – IF
(typ.)
Ta = 25°C
100
50
30
10
5
3
1
1
3
5
10
30
50
100
Luminous intensity IV (mcd)
Forward current IF (mA)

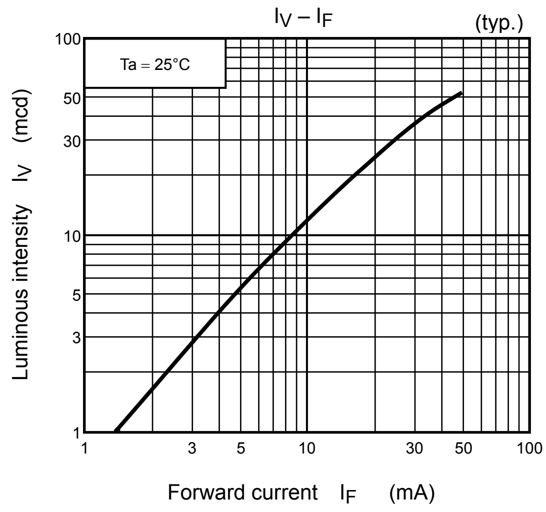

IV – Tc
(typ.)
10
5
3
1
0.5
0.3
0.1
–25
0
25
50
75
100
Relative luminous intensity IV
Case temperature Tc (°C)

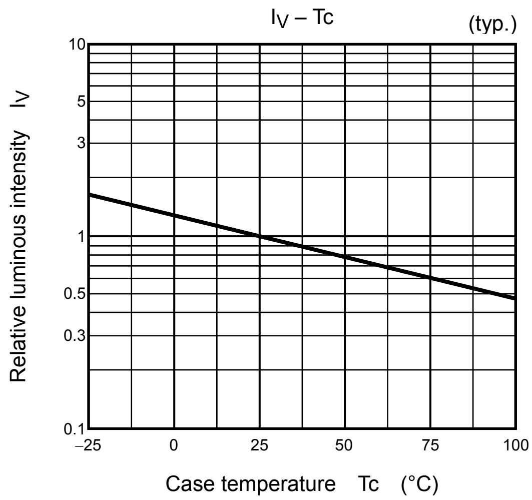

Wavelength characteristic
(typ.)
IF = 20 mA
Ta = 25°C
1.0
0.8
0.6
0.4
0.2
0
540
560
580
600
620
Relative luminous intensity
Wavelength λ (nm)

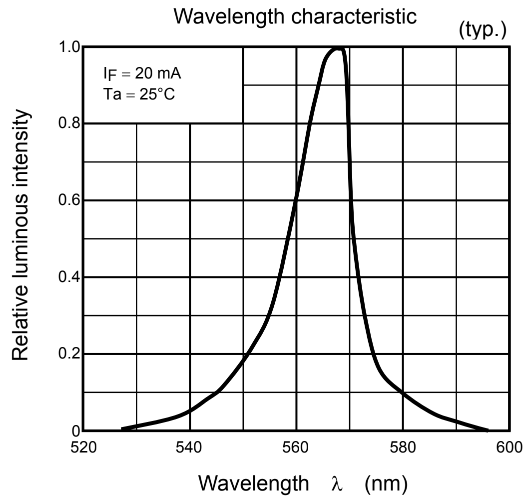

Radiation pattern
Ta = 25°C
(typ.)
0°
10°
20°
30°
40°
50°
60°
70°
80°
90°
0
0.2
0.4
0.6
0.8
1.0

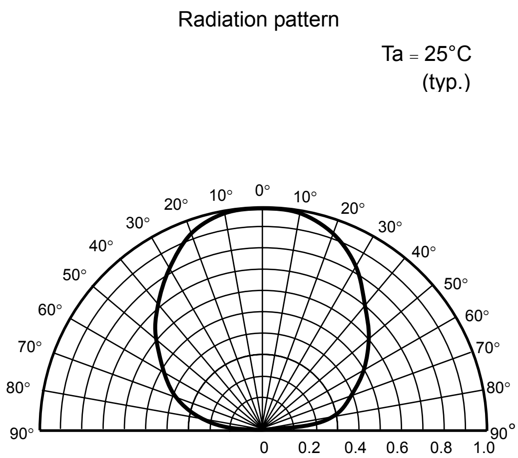
TLPGE1100B


I_F – V_F
(typ.)
Ta = 25°C
100
50
30
10
5
3
1
1.7
1.8
1.9
2.0
2.1
2.2
2.3
Forward current I_F (mA)
Forward voltage V_F (V)


I_V – I_F
(typ.)
Ta = 25°C
100
50
30
10
5
3
1
1
3
5
10
30
50
100
Luminous intensity I_V (mcd)
Forward current I_F (mA)


I_V – Tc
(typ.)
10
5
3
1
0.5
0.3
0.1
–25
0
25
50
75
100
Relative luminous intensity I_V
Case temperature Tc (°C)


Wavelength characteristic
(typ.)
I_F = 20 mA
Ta = 25°C
1.0
0.8
0.6
0.4
0.2
0
520
540
560
580
600
Relative luminous intensity
Wavelength λ (nm)


Radiation pattern
Ta = 25°C
(typ.)
0°
10°
20°
30°
40°
50°
60°
70°
80°
90°
0
0.2
0.4
0.6
0.8
1.0

Packaging

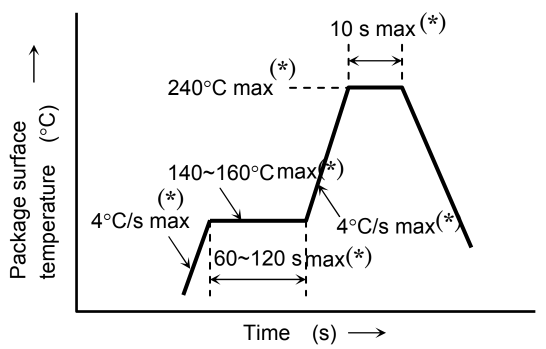
These LED devices are packed in an aluminum envelope with a silica gel and a moisture indicator to avoid moisture absorption. The optical characteristics of the devices may be affected by exposure to moisture in the air before soldering and they should therefore be stored under the following conditions:

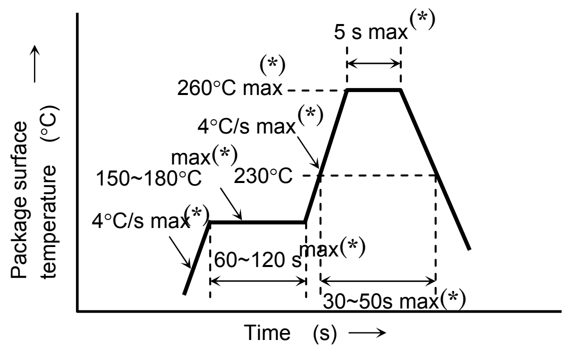
1. This moisture proof bag may be stored unopened within 12 months at the following conditions.
   Temperature: 5°C~30°C
   Humidity: 90% (max)
2. After opening the moisture proof bag, the devices should be assembled within 168 hours in an environment of 5°C to 30°C/60% RH or below.
3. If upon opening, the moisture indicator card shows humidity 30% or above (Color of indication changes to pink) or the expiration date has passed, the devices should be baked in taping with reel.
   After baking, use the baked devices within 72 hours, but perform baking only once.
   Baking conditions: 60±5°C, for 12 to 24 hours.
   Expiration date: 12 months from sealing date, which is imprinted on the same side as this label affixed.
4. Repeated baking can cause the peeling strength of the taping to change, then leads to trouble in mounting. Furthermore, prevent the devices from being destructed against static electricity for baking of it.
5. If the packing material of laminate would be broken, the hermeticity would deteriorate. Therefore, do not throw or drop the packed devices.

Mounting Method

Soldering

- Reflow soldering (example)

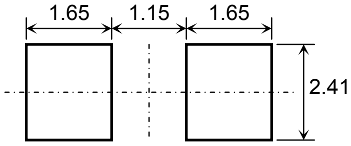




- The products are evaluated using above reflow soldering conditions. No additional test is performed exceed the condition (i.e. the condition more than (*)MAX values) as a evaluation. Please perform reflow soldering under the above conditions.
- Please perform the first reflow soldering with reference to the above temperature profile and within 168 h of opening the package.
- Second reflow soldering
  In case of second reflow soldering should be performed within 168 h of the first reflow under the above conditions.
  Storage conditions before the second reflow soldering: 30°C, 60% RH (max)
- Make any necessary soldering corrections manually.
  (only once at each soldering point)
  Soldering iron: 25 W
  Temperature : 300°C or less
  Time : within 3 s
- If the products need to be performed by other soldering method (ex. wave soldering), please contact Toshiba sales representative.

Recommended soldering pattern

Unit: mm



Cleaning

When cleaning is required after soldering, Toshiba recommends the following cleaning solvents.
It is confirmed that these solvents have no effect on semiconductor devices in our dipping test (under the recommended conditions). In selecting the one for your actual usage, please perform sufficient review on washing condition, using condition and etc.

ASAHI CLEAN AK-225AES	: (made by ASAHI GLASS)
KAO CLEAN TROUGH 750H	: (made by KAO)
PINE ALPHA ST-100S	: (made by ARAKAWA CHEMICAL)
TOSHIBA TECHNOCARE (FRW-17, FRW-1, FRV-100)	: (made by GE TOSHIBA SILICONES)

Precautions when Mounting

Do not apply force to the plastic part of the LED under high-temperature conditions.
To avoid damaging the LED plastic, do not apply friction using a hard material.
When installing the PCB in a product, ensure that the device does not come into contact with other cmponents.

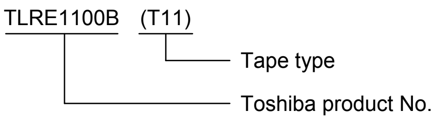
Tape Specifications

1. Product number format

The type of package used for shipment is denoted by a symbol suffix after the product number. The method of classification is as below. (this method, however does not apply to products whose electrical characteristics differ from standard Toshiba specifications)

(1) Tape Type: T14 (4-mm pitch)

(2) Example

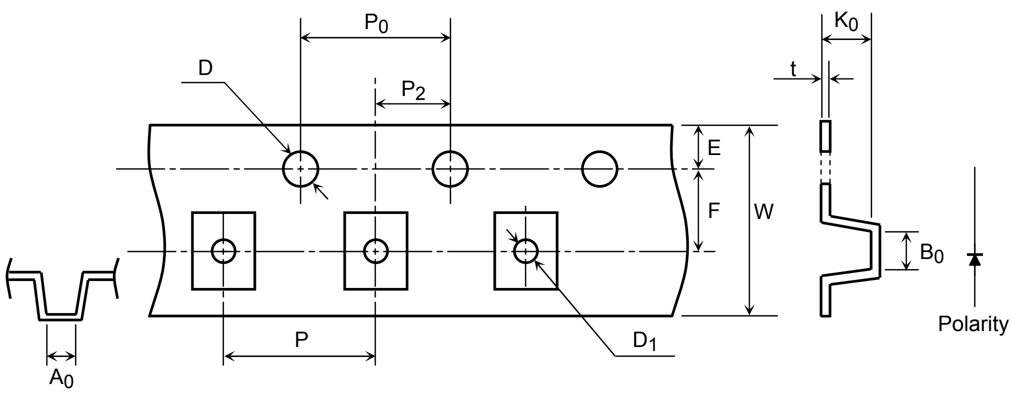


2. Tape dimensions

Unit: mm

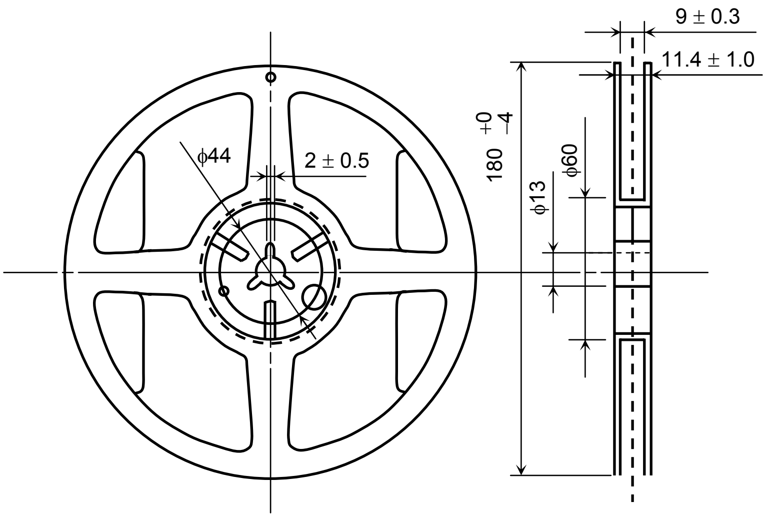
Symbol	Dimension	Tolerance
D	1.5	+0.1/–0
E	1.75	±0.1
P_0	4.0	±0.1
t	0.3	±0.05
F	3.5	±0.05
D_1	1.5	±0.1

Symbol	Dimension	Tolerance
P_2	2.0	±0.05
W	8.0	±0.3
P	4.0	±0.1
A_0	2.9	±0.1
B_0	3.7	±0.1
K_0	2.3	±0.1

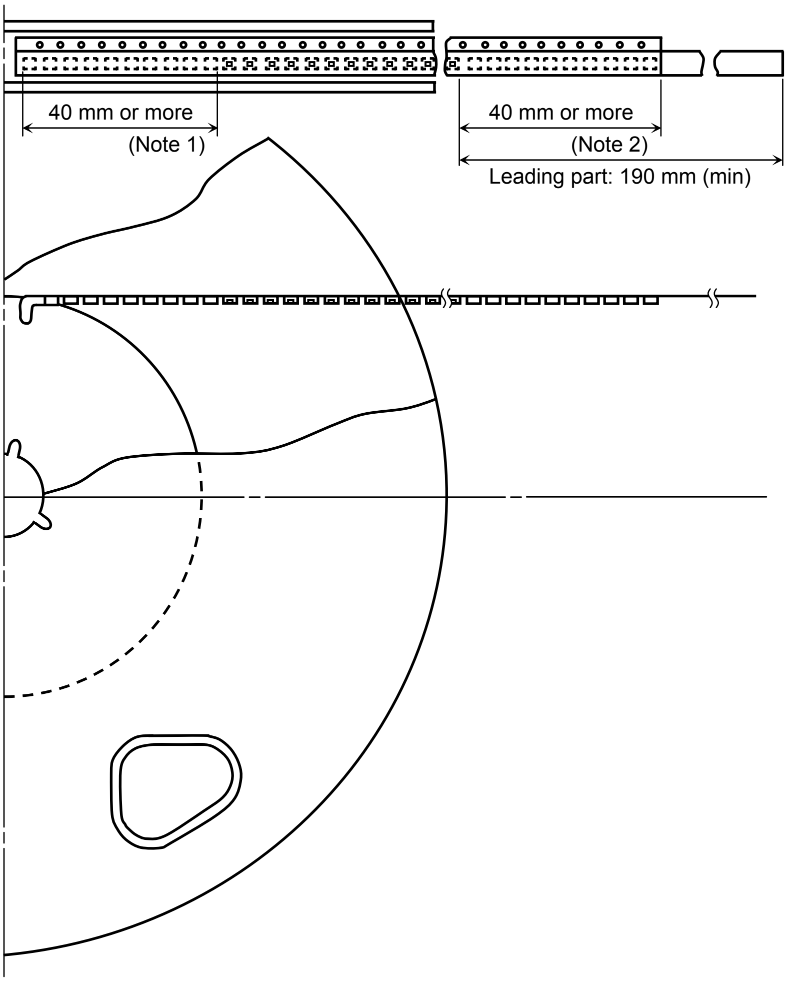


3. Reel dimensions

Unit: mm



4. Leader and trailer sections of tape



Note1: Empty trailer section

Note2: Empty leader section

5. Packing form

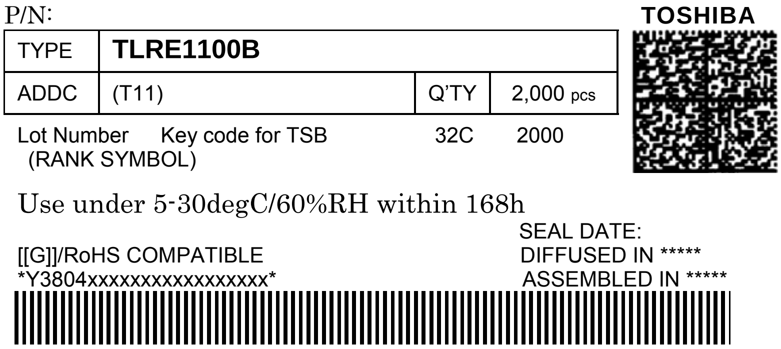
(1) Packing quantity

Reel	2,000 pcs
Carton	10,000 pcs

(2) Packing form: Each reel is sealed in an aluminum pack with silica gel.

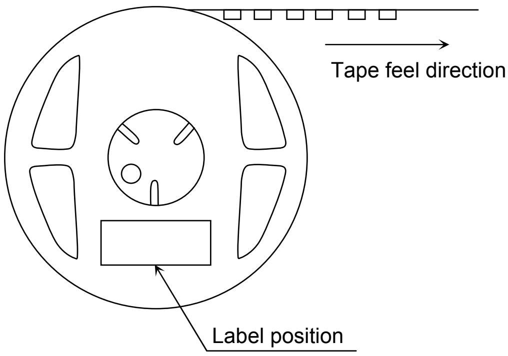
6. Label format

(1) Example: TLRE1100B (T11)

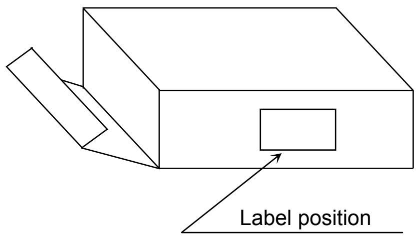


(2) Label location

- Reel



- Carton



- The aluminum package in which the reel is supplied also has the label attached to center of one side.

RESTRICTIONS ON PRODUCT USE

- The information contained herein is subject to change without notice.
- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
  In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the “Handling Guide for Semiconductor Devices,” or “TOSHIBA Semiconductor Reliability Handbook” etc.
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury (“Unintended Usage”). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer’s own risk.
- The products described in this document shall not be used or embedded to any downstream products of which manufacture, use and/or sale are prohibited under any applicable laws and regulations.
- GaAs(Gallium Arsenide) is used in this product. The dust or vapor is harmful to the human body. Do not break, cut, crush or dissolve chemically.
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